

WHAT IS CLAIMED IS:

1. A method for determining the amount of charge which can be drawn from a storage battery by measuring at least one of battery currents and battery voltages at at least two points in time before or during a rise phase and during or after a decay phase of a charging or discharging operation, the method comprising:

determining a characteristic variable for the amount of charge, the characteristic variable being derived from the relationship of at least one battery voltage value from the rise phase with respect to at least one battery voltage value from the decay phase or from the relationship of at least one battery current value from the rise phase with respect to at least one battery current value from the decay phase.

2. The method of Claim 1 wherein the step of determining the characteristic variable comprises deriving the characteristic variable from the relationship of two battery voltage values which were respectively determined in the rise phase and decay phase for a fixed numerical value for the battery current.

3. The method of Claim 1 wherein the step of determining the characteristic variable comprises deriving the characteristic variable from the relationship of two battery current values which were respectively determined in the rise phase and decay phase for a fixed battery voltage.

4. The method of Claim 1 wherein the step of determining the characteristic variable comprises deriving the characteristic variable from the relationship of two battery voltage values which were respectively determined in the rise phase and decay phase for approximately identical battery current.

5. The method of Claim 1 wherein the step of determining the characteristic variable comprises deriving the characteristic variable from the relationship of two battery current values which were respectively determined in the rise phase and the decay phase for an approximately identical battery voltage.

6. The method of Claim 4 wherein the relationship is the difference between two battery voltages determined at different points in time, the battery currents being approximately identical at the two points in time.

7. The method of Claim 5 wherein the relationship is the difference between two battery currents determined at different points in time, the battery voltages being approximately identical at the two points in time.

8. The method of Claim 1 wherein the relationship used to derive the characteristic variable is the ratio of a battery voltage determined at a first point in time before or during the rise phase of the loading with respect to a battery voltage determined at a second point in time after or during the decay phase, wherein the storage battery has a current that is approximately the same at the first and second points in time.

9. The method of Claim 1 wherein the relationship use to derive the characteristic variable is the ratio of a battery current determined at a first point in time before or during the rise phase with respect to a battery current determined at a second point in time after or during the decay phase, wherein the storage battery has a voltage that is approximately the same at the first and second points in time.

10. The method of Claim 1 wherein the at least one of the two points in time lie in the phase of starting an internal combustion engine coupled to the storage battery.

11. The method of Claim 1 wherein the storage battery has a current that is approximately zero at at least one of the two points in time.

12. The method of Claim 1 further comprising continuously recording and storing of battery current values and battery voltage values as hysteresis curves during loading.

13. The method of Claim 13 further comprising evaluating the stored hysteresis curves for the determination of the characteristic variable.

14. The method of Claim 1 further comprising at least one of interpolating and extrapolating battery voltage values and battery current values to determine battery voltages for given battery currents or for the determination of battery currents for given battery voltages.

15. The method of Claim 1 further comprising determining at least one of a state of charge of the storage battery and a battery temperature of the storage battery.

16. The method of Claim 15 further comprising correcting the characteristic variable utilizing at least one of the state of charge of the storage battery and the battery temperature of the storage battery.

17. The method of Claim 1 further comprising correcting the characteristic variable utilizing a charge capacity drawn from the storage battery over a defined time period.

18. The method of Claim 1 wherein the determination of the characteristic variable takes place when the time period between the two points in time is above a defined minimum time period and below a defined maximum time period.

19. The method of Claim 1 further comprising comparing the characteristic variable with given families of characteristics for amounts of charge which can be drawn in dependence on the states of charge, battery temperatures and characteristic variables.

20. The method of Claim 15 further comprising learning and storing families of characteristics for characteristic variables of a storage battery in a new state in dependence on the state of charge and the battery temperatures.

21. The method of Claim 20 further comprising determining the amount of charge which can be derived from the characteristic variables for a momentary state of charge and a momentary battery temperature with a corresponding nominal value characteristic variable which is determined from the family of characteristics for the momentary state of charge and the momentary battery temperature.

22. The method of Claim 15 further comprising calculating a coefficient of measure as a difference between or ratio of the determined characteristic variable and the corresponding characteristic variable in the new state for the momentary state of charge and the momentary battery temperature.

23. The method of Claim 22 further comprising determining the amount of charge which can be drawn with a family of characteristics for values of the amount of charge which can be drawn, which are stored in

the family of characteristics in dependence on states of charge, battery temperature, and coefficients of measure.

24. The method of Claim 1 further comprising determining the characteristic variable from parameters of an equivalent circuit or model, the parameters being determined by adaptation of the equivalent circuit or model to at least one of the battery current values and battery voltage values in the rise phase and decay phase.

25. A monitoring device for a storage battery comprising:
means for measuring battery voltage values and battery current values; and
evaluation means;
wherein the means for measuring measures at least one of battery currents and battery voltages at at least two points in time before or during a rise phase and during or after a decay phase of a charging or discharging operation; and
wherein the evaluation means are configured to determine a characteristic variable for the amount of charge, the characteristic variable being derived from the relationship of at least one battery voltage value from the rise phase with respect to at least one battery voltage value from the decay phase or from the relationship of at least one battery current value from the rise phase with respect to at least one battery current value from the decay phase.